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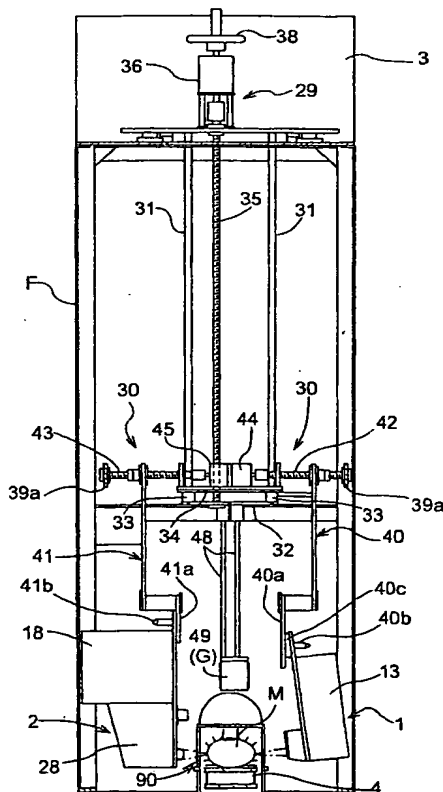
(10) 国際公開番号
WO 2004/059300 A1

- (51) 国際特許分類⁷: G01N 21/27, 21/35 (71) 出願人 (米国を除く全ての指定国について): 株式会社クボタ (KUBOTA CORPORATION) [JP/JP]; 〒556-8601 大阪府 大阪市 浪速区敷津東一丁目 2 番 4 7 号 Osaka (JP).
- (21) 国際出願番号: PCT/JP2003/016536
- (22) 国際出願日: 2003 年 12 月 24 日 (24.12.2003)
- (25) 国際出願の言語: 日本語 (72) 発明者; および
- (26) 国際公開の言語: 日本語 (75) 発明者/出願人 (米国についてのみ): 河端 真一 (KAWA-BATA, Shinichi) [JP/JP]; 〒590-0823 大阪府 堺市 石津北町 6 4 番地 株式会社クボタ堺製造所内 Osaka (JP). 石見 憲一 (IWAMI, Kenichi) [JP/JP]; 〒590-0823 大阪府 堺市 石津北町 6 4 番地 株式会社クボタ堺製造所内 Osaka (JP). 片山 良行 (KATAYAMA, Yoshiyuki) [JP/JP];
- (30) 優先権データ:
特願 2002-372878 2002 年 12 月 24 日 (24.12.2002) JP
特願 2003-11091 2003 年 1 月 20 日 (20.01.2003) JP

[続葉有]

(54) Title: FRUIT-VEGETABLE QUALITY EVALUATION DEVICE

(54) 発明の名称: 果菜類の品質評価装置



(57) Abstract: There is provided a quality evaluation device capable of evaluating the quality of fruits-vegetables with a high accuracy. The transmitting light from an object (M) to be measured is received by a light reception sensor of charge accumulation type. Charge is accumulated in the light reception sensor from the accumulation start timing until the time set for accumulation has elapsed. After this, an electric charge accumulation discharge processing for discharging the electric charge accumulated in the light reception sensor until the time set for discharge has elapsed is repeatedly performed. When the object (M) reaches the measurement position, the charge accumulated is discharged. After this, a measurement charge accumulation processing is performed for accumulating charge used as light reception information for quality evaluation. Furthermore, the quality evaluation device includes: a light reception section (2) for receiving near-infrared light projected from a projection section (1) to the object to be measured by performing spectral analysis; and a calculation section for calculating a quality value of the fruit-vegetable in accordance with the received light information from the light reception section (2) and a measurement equation. This calculation section is configured so as to perform wavelength calibration in accordance with the received light information obtained when a reference body for wavelength calibration is measured. The measurement equation is created with a smaller resolution than the maximum resolution of the received light information decided in accordance with the number of unit light reception sections. The wavelength calibration performed by using the received light information is performed with a smaller resolution than the resolution required for creating the measurement equation.

(57) 要約: 果菜類の品質評価値を求めるときの計測精度に優れた品質評価装置を得るために、被計測物 (M) からの透過光を電荷蓄積型の受光センサで受光すると共に、蓄電開始タイミングから蓄電用設定時間が経過するまで受光センサに電荷を蓄積させ、その後、放電用設定時間が経過するまで受光センサに蓄積された電荷を放出させる電荷蓄積放電処理を繰り返し実行し、且つ、被計測物 (M) が計測箇所に至ると、蓄積した電荷を放出させ、その後、

品質評価用の受光情報として用いる電荷を蓄積させる計測用電荷蓄積処理を実行するように構成してある。さらに、被計測物に対して投光部 (1) より投射した近赤外域の光を分光

[続葉有]



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(81) 指定国 (国内): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) 指定国 (広域): ARIPO 特許 (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), ユーラシア特許 (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), ヨーロッパ特許 (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI 特許 (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

添付公開書類:

— 国際調査報告書

2 文字コード及び他の略語については、定期発行される各 PCT ガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

して受光する受光部 (2) と、この受光部 (2) からの受光情報と検量式とに基づいて果菜類の品質評価値を求める演算部とを備えてあり、この演算部が、波長校正用の基準体を計測したときの受光情報に基づいて波長校正処理を行うよう構成され、複数の単位受光部の数に応じて定まる受光情報の最大分解能よりも小さい分解能で検量式が作成される。そして、受光情報を用いて行う波長校正処理を、検量式の作成のときの分解能よりも小さな分解能で行うよう構成してある。

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/16536

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl⁷ G01N21/27; G01N21/35

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl⁷ G01N21/00-21/61

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-2004
Kokai Jitsuyo Shinan Koho 1971-2004 Jitsuyo Shinan Toroku Koho 1996-2004

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PATOLIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2002-107294 A (Kubota Corp.), 10 April, 2002 (10.04.02), Full text (Family: none)	1-13
Y	JP 2002-77522 A (Casio Computer Co., Ltd.), 15 March, 2002 (15.03.02), Full text (Family: none)	1-4
Y	JP 10-62337 A (Sumitomo Metal Mining Co., Ltd.), 06 March, 1998 (06.03.98), Full text (Family: none)	3

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search
05 April, 2004 (05.04.04)

Date of mailing of the international search report
20 April, 2004 (20.04.04)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/16536

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 63-81226 A (Ares-Serono Research & Development Ltd. Partnership), 12 April, 1988 (12.04.88), Full text & EP 255302 A & US 4828387 A	5-13
Y	JP 2000-162047 A (Komatsu Ltd.), 16 June, 2000 (16.06.00), Full text (Family: none)	5-13
Y	JP 2002-181701 A (Saika Technological Institute Foundation), 26 June, 2002 (26.06.02), Full text (Family: none)	9
Y	JP 2002-168772 A (Kubota Corp.), 14 June, 2002 (14.06.02), Full text (Family: none)	9
Y	JP 2002-174592 A (Kubota Corp.), 21 June, 2002 (21.06.02), Full text (Family: none)	9
Y	JP 8-29333 A (Kubota Corp.), 02 February, 1996 (02.02.96), Full text (Family: none)	10
Y	JP 2002-107303 A (Kubota Corp.), 10 April, 2002 (10.04.02), Full text (Family: none)	13
Y	JP 2000-199743 A (Mitsui Mining & Smelting Co., Ltd.), 18 July, 2000 (18.07.00), Full text (Family: none)	13
Y	JP 7-63674 A (Wakayama-ken), 10 March, 1995 (10.03.95), Full text (Family: none)	5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/16536

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:

because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:

because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:

because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The first group of inventions disclosed in claims 1-4 and the second group of invention disclosed in claims 5-13 are matched only in that they relate to a device for measuring the reflected light or transmitted light from a fruit-vegetable so as to evaluate its quality. The other technical features are different between the first group and the second group. Their objects are also different. The object of the former is to reduce the error caused by residual charge when using a charge accumulation type sensor and the time required for its operation while the object of the latter is to reduce the time required for creating a measurement equation.

(See extra sheet)

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.

☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/16536

Continuation of Box No.II of continuation of first sheet(1)

Accordingly, the inventions of the International Application disclosed in claims 1-13 are divided into two groups.